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14. ABSTRACT Center of Gravity analysis is currently considered a key element throughout the seven planning steps of the Joint Operation Planning Process (JOPP). The foreword from former chairman of the Joint Chiefs of Staff, Admiral Michael Mullen, envisioned JP 5-0 to provide the tools required of military planners in a complex and uncertain operational environment. The 24 August 2010 revision of MCWP 5-1, Marine Corps Planning Process (MCPP) utilizes COG analysis in almost every step and uses it as a fundamental aspect in driving planning and subsequent commander decisions. Despite the value and importance placed on COG analysis in the MCPP, MCWP 5-1 is grossly deficient in providing Marine Corps planners with the background, purpose, and application of COG analysis to be used effectively and consistently by planning teams. MCWP 5-1 is meant to be a guide and provide methods and tools for planners to plan operations regardless of their complexity and scope. Yet Marine planners are provided almost no method for conducting COG analysis, which is a necessary input and drives major components of Marine Corps planning. Without the proper tools for center of gravity analysis, Marine planners cannot effectively or innovatively plan. Without innovative conceptual planning, the Marine Corps cannot be the elite fighting force of the future.							
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MASTER OF MILITARY STUDIES

**CENTER OF GRAVITY ANALYSIS:
THE MARINE CORPS PLANNING PROCESS NEEDS TO CATCH UP.**

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

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Executive Summary

Title: Center of Gravity Analysis: The Marine Corps Planning Process Needs to Catch Up

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Thesis: In order for COG analysis to be a valuable and useful concept for Marine planners, MCWP 5-1 needs to be re-written to mirror JP 5-0. This would provide planners across the Marine Corps with adequate knowledge for correct and consistent application in today's planning.

Discussion: Center of Gravity analysis is currently considered a key element throughout the seven planning steps of the Joint Operation Planning Process (JOPP). The foreword from former chairman of the Joint Chiefs of Staff, Admiral Michael Mullen, envisioned JP 5-0 to provide the tools required of military planners in a complex and uncertain operational environment. The 24 August 2010 revision of MCWP 5-1, Marine Corps Planning Process (MCPP) utilizes COG analysis in almost every step and uses it as a fundamental aspect in driving planning and subsequent commander decisions. Despite the value and importance placed on COG analysis in the MCPP, MCWP 5-1 is grossly deficient in providing Marine Corps planners with the background, purpose, and application of COG analysis to be used effectively and consistently by planning teams. MCWP 5-1 is meant to be a guide and provide methods and tools for planners to plan operations regardless of their complexity and scope. Yet Marine planners are provided almost no method for conducting COG analysis, which is a necessary input and drives major components of Marine Corps planning.

Conclusion: Without the proper tools for center of gravity analysis, Marine planners cannot effectively or innovatively plan. Without innovative conceptual planning, the Marine Corps cannot be the elite fighting force of the future.

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Center of Gravity Analysis... What's the point?

Center of gravity analysis (COG) is a theory that has been studied since its inception in the 1800s. Carl Von Clausewitz is generally considered the dominant source of COG theory. The center of gravity theory is one of, if not the most debated and researched concepts in military planning and operational art. Most of the modern research and debate into center of gravity analysis centers on correct incorporation of the theory into practical application. Not only has there been a long standing debate over how to incorporate COG analysis into military planning and operations, but more debate has occurred over what Clausewitz meant and the context in which he was writing in the early 1800s.¹ Some have argued that this approach fit the times of the Napoleonic Wars and is no longer applicable in modern warfare. The exploration into that context and the translations that have been published since have led to more confusion over the topic than clarity. The most commonly accepted and used translation of Carl Von Clausewitz's work is *On War*, edited and translated by Michael Howard and Peter Paret. Howard and Paret attempted to capture Clausewitz's context and thought process by printing the book in the order in which Clausewitz wrote.² Certainly in recent history, center of gravity theory and its usage in military planning has had a significant influence on military leaders. So the question becomes, how can such a long-standing theory that has been studied so much still be the source of great debate and, more importantly, confusion? Over the last ten years the application of center of gravity analysis has become increasingly formalized. COG analysis has undergone many revisions in every service planning document and a wide range of definitions have been used. These definitions, while similar, were different enough to keep the services on the same page, but not reading the same paragraph.

More recently with the increased focus on joint operations, center of gravity analysis has received more attention and the background and its intended application in the military planning process has been expanded in the latest *Joint Operation Planning 11 August 2011* revision of joint publication 5-0 (JP 5-0). Center of Gravity analysis is currently considered a key element throughout the seven planning steps of the Joint Operation Planning Process (JOPP). The foreword from former chairman of the Joint Chiefs of Staff, Admiral Mullen, envisioned JP 5-0 to provide the tools required for military planners in a complex and uncertain operational environment. Likewise, the 24 August 2010 revision of *Marine Corps Warfighting Publication 5-1, Marine Corps Planning Process* (MCPP) utilizes COG analysis in almost every step and uses it as a fundamental aspect in driving planning and subsequent commander decisions.

Despite the value and importance placed on COG analysis in the MCPP, the MCWP 5-1 is grossly deficient in providing Marine Corps planners with the background, purpose, and application of COG analysis to be used effectively and consistently by planning teams. MCWP 5-1 is meant to be a guide and provide methods and tools for planners to successfully plan operations regardless of their complexity and scope. Yet Marine planners are provided almost no method for conducting COG analysis, which is a necessary input and drives major components of Marine Corps planning.

COG analysis is often conducted incorrectly or ignored altogether due to the confusion about what it actually is and how it can assist in focusing the planning effort. In order to remedy this problem, the Marine Corps needs to align the service planning documents with the 2011 edition of JP 5-0. While not perfect, JP 5-0 successfully clarified and improved the understanding of COG analysis. In order for COG analysis to be a valuable and useful concept used by Marine planners, MCWP 5-1 needs to be re-written to at the very least mirror the JP 5-0.

This would provide planners across the Marine Corps adequate knowledge for correct and consistent application of center of gravity analysis in today's planning.

Where the JP 5-0 and the MCWP 5-1 are Today

Almost every major war or conflict has been a joint endeavor, or at the very least contained joint elements. As the United States military moves into 2013 the operating environment is becoming even more focused on joint operations. Planners must be able to employ combat forces efficiently across the spectrum of conflict. In addition, with the potential increase of small scale operations and the emerging budgetary realities, the U.S. military faces the call to be efficient and precise in its operations. Part of the successful execution of these operations includes being competent and efficient planners. One of the critical aspects of planning that should aid joint planners in the application of forces efficiently and with precision is center of gravity analysis. The Joint Operation Planning publication 5-0 has taken steps to improve the understanding of center of gravity analysis for joint planners by incorporating many aspects of the predominate theorists.

In order for joint planning teams to be successful, individual service members need to have the same background knowledge and understanding to avoid disjointed planning that would result in the ineffective application of combat power. General James Amos, the Commandant of the Marine Corps, currently has two themes that support the need for Marine planners to be in line with the joint planning documents. These two themes are; "the Marine Corps is a microcosm of the joint force, and that Marines maintain modern doctrine and continue to be innovators."³ If the Marine Corps is to be an integral part of the joint force we need to have an understanding of the language and theory that are driving joint operations.

As stated in the introduction, center of gravity analysis has been the subject of numerous papers, articles, and service wide debate. This paper is not intended to dispute or prove the

validity of COG analysis or its usefulness, but instead to demonstrate why the MCWP 5-1 is deficient when compared to the Joint Operations publication 5-0. First, we will examine the major elements of COG theory that are included in JP 5-0. By doing so, it is possible to establish a common ground for understanding the theory and its usage. Along with the major theorists, aspects of a few contemporary military theorists' study of COG analysis will be included, since aspects of their research are also part of JP 5-0. This background on the theory behind JP 5-0 can demonstrate its utility for planners compared to what is provided in MCWP 5-1.

Additionally, recommendations on how to improve Marine Corps doctrine will follow. COG analysis should be a helpful tool, not a club. This paper will not add to the tall stack of papers, books, and articles debating the translations, concepts, or utility of COG analysis in military planning. This paper will rather demonstrate that JP 5-0 is a good tool for planners and that MCWP 5-1 at best adds confusion instead of providing Marine planners an effective method for center of gravity analysis.

Background Theory: The Source

As we begin to look into the original theory that is central to all the components in JP 5-0 one must start with Clausewitz. Some modern theorist might also argue that you could end the debate on center of gravity in Clausewitz's *On War* as well. Any discussion on center of gravity usually begins with Clausewitz, and rightfully so. Other military theorists discussed similar topics for consideration in military actions prior to the writings of Clausewitz, but no theorist has had the long lasting impact of Carl Von Clausewitz. Clausewitz's *On War* touches on the theory of center of gravity in numerous chapters in his writings, and often makes identifying a single definition difficult by adding levels to previous definitions.

One of the first examples of Clausewitz's center of gravity theory stands out in Book One of *On War*. "The end for which a soldier is recruited, clothed, armed, trained, the whole object of his sleeping, eating, drinking, and marching is simply that he should fight at the right place and the right time."⁴ This quotation is not normally found in documentation regarding Clausewitz's definitions, but it draws on the need for exerting combat power efficiently and effectively at the right time and place, namely, the enemy's center of gravity. This concept is markedly similar to the Marine Corps Maneuver Warfare doctrine. Most theorists draw upon the center of gravity discussion in Books Six and Eight. In Book Six, Clausewitz writes, "A center of gravity is always found where the mass is concentrated most densely. It presents the most effective target for a blow."⁵ Later, in Book Eight Clausewitz states, "The first principle is that the ultimate substance of every strength must be traced back to the fewest possible sources, and ideally one alone."⁶ Clausewitz adds clarity to this notion by describing two scenarios that place the center of gravity around either a central political power in a capital city, or in a theater of war containing various armies. This point would be the single largest concentration of forces.⁷ The Napoleonic influence is cited in David Chandler's book, *The Campaigns of Napoleon*, where Napoleon is quoted, "There are in Europe many good generals, but they see too many things at once. I see only one thing, namely the enemy's main body. I try to crush it, confident that secondary matters will then settle themselves."⁸ This quote relates to the popular notion of only one true center of gravity, despite as James Rainey points out in his monograph, that Clausewitz seemingly contradicts himself later in Book Eight when he talks about shifting to a new source of power once an enemy force is destroyed.⁹

Finally, in Chapter Four of Book Eight, is the definition that most planners are familiar with. The JP 5-0 takes excerpts from this definition. "One must keep the dominant

characteristics of both belligerents in mind. Out of these characteristics a center of gravity develops, the **hub of all power and movement, on which everything depends.** That is **the point against all our energies should be directed.**¹⁰ This definition is the most cited and utilized source for “defining” centers of gravity. What is interesting to note with regard to the use of this popular definition in JP 5-0 is the expansion and addition of other aspects of center of gravity not normally related to this passage. The following definition comes from JP 5-0 and demonstrates the usage of Clausewitz’s popular definition, but goes farther to assist military planners in the comprehension of centers of gravity and the context in which to view them.

A COG is a source of power that provides moral or physical strength, freedom of action, or will to act. It is what Clausewitz called **“the hub of all power and movement, on which everything depends...the point at which all our energies should be directed.”** An objective is always linked to a COG. There may also be different COGs at different levels, but they should be nested. At the strategic level, a COG could be a military force, an alliance, political or military leaders, a set of critical capabilities or functions, or national will. At the operational level, a COG often is associated with the adversary’s military capabilities—such as a powerful element of the armed forces—but could include other capabilities in the operational environment. In identifying COGs it is important to remember that irregular warfare focuses on legitimacy and influence over a population, unlike traditional warfare, which employs direct military confrontation to defeat an adversary’s armed forces, destroy an adversary’s war-making capacity, or seize or retain territory to force a change in an adversary’s government or policies. Therefore, in an irregular warfare environment, the enemy and friendly COG will most likely be the same population.

COGs exist in an adversarial context involving a clash of moral wills and/or physical strengths. They are formed out of the relationships between adversaries, and they do not exist in a strategic or operational vacuum. COGs are framed by each party’s view of the threats in the operational environment and the requirements to develop/maintain power and strength relative to their need to be effective in accomplishing their objectives. Therefore, commanders not only must consider the enemy COGs, but they also must identify and protect their own¹¹

The existence of multiple centers of gravity at the different levels of war is an addition of a modern theory to Clausewitz’s popular definition, and one that is often discouraged or considered incorrect by many planners. This aspect of JP 5-0 will be explored in more detail

when we examine the theories and ideas of modern center of gravity study and their incorporation into JP 5-0.

Background Theory: Clausewitz Wasn't Alone.

Carl Von Clausewitz is undoubtedly the most substantial contributor to the theory of center of gravity analysis. Prior to JP 5-0, Clausewitz's definitions were generally considered the sole source in doctrinal publications, both individual service publications and joint doctrine alike. Despite his overwhelming influence other military theorists of his time also explored aspects of center of gravity or focal points of the enemy and friendly forces. One of these "other" theorists who wrote to some degree in competition with Clausewitz was the Swiss military theorist Antoine-Henri Jomini. Jomini also wrote his theories during and after the Napoleonic Wars around the same time as Carl Von Clausewitz. Jomini explored a different but very similar theory to center of gravity. Clausewitz, like Jomini, believed in points that held military value, whether those points were actual enemy units or environmental aspects with regard to enemy forces. Jomini differentiated these into strategic lines and points, and decisive strategic points.¹² Jomini wrote "Strategic lines and points are of different kinds. Some receive this title simply from their position, which gives them all their importance: these are permanent geographic strategic points. Others have a value from the relations they bear to the positions of the masses of the hostile troop."¹³ While different, Jomini has identified what we call key terrain and also identified the importance and focus on enemy troop concentrations. The subtle difference in Jomini and Clausewitz may stem from Jomini's more scientific theories oriented on "how to" conduct war vice Clausewitz's philosophical nature of his writing and describing the phenomena of war. It is not hard to grasp the similarity in the concepts since both Clausewitz and Jomini wrote and experienced similar events to influence the development of their theory. Jomini

however, identifies the essence of what Clausewitz would call a center of gravity, “whose importance is constant and immense: the latter are called DECISIVE strategic points. He clarifies this definition by classifying any point in a theater of war as a decisive strategic point as those points that “are capable of exercising a marked influence either upon the result of the campaign or upon a single enterprise.”¹⁴ Jomini goes further in distinguishing decisive points as well. These decisive points are lesser points within a military theater that serve as important areas either by their geographic importance within a particular theater or as they may relate to an enemy concentration of troops.

With regard to maneuver Jomini considers “decisive points of maneuver are on that flank of the enemy upon which, if his opponent operates, he can more easily cut him off from his base and supporting forces without being exposed to the same danger.”¹⁵ You can see the difference between Clausewitz and Jomini in how they identify critical points or areas for military planners to consider. Both theorists identify capitals as important to varying degrees based on the theater of war and also see key terrain and troop concentrations as points of focus. While Clausewitz pushes for fewer of these points, Jomini’s theory provides some concepts on planning against dispersed armies, or theaters that have multiple points that are important even though secondary to decisive strategic points. It is interesting to note that both theorists accept the idea that strategic decisive points or centers of gravity may be out of reach or impractical to conduct a current operation against. Jomini certainly takes a similar track as Clausewitz’s center of gravity, but to a much different degree with multiple points of value, either geographic in nature or maneuver and troop oriented.

The writers of JP 5-0 in the 2011 edition added the aspects of Jomini's theory following the discussion of center of gravity in chapter III of JP 5-0.

A *decisive point* is a geographic place, specific key event, critical factor, or function that, when acted upon, allows a commander to gain a marked advantage over an adversary or contributes materially to achieving success (e.g., creating a desired effect, achieving an objective). Decisive points can greatly influence the outcome of an action. Decisive points can be physical in nature, such as a constricted sea lane, a hill, a town, WMD material cache or facility, or an air base; but they could include other elements such as command posts, critical boundaries, airspace, or communications and/or intelligence nodes. In some cases, specific key events also may be decisive points, such as attainment of air or maritime superiority, commitment of the adversary's reserve, opening a supply route during humanitarian operations, or gaining the trust of a key leader. In still other cases, decisive points may have a larger systemic impact and, when acted on, can substantially affect the adversary's information, financial, economic, or social systems. When dealing with an irregular threat, commanders and their staffs should consider how actions against decisive points will affect not only the enemy, but also the relevant population and their behavior and relationships with enemy and friendly forces, and the resultant impact on stability in the area or region of interest.¹⁶

Previous versions ended with the 1800s definition provided by Clausewitz. The addition of multiple theories arms the military planner with another aspect and angle to successfully identify COGs and those points that may lead to a COG. The realization that an enemy most likely will not have a single point to focus all your efforts on, or rather the reality of a complex network and multiple aspects shows a modern slant to the original theories. It is quite realistic that a country or army can be targeted at different points to affect the center of gravity. When looking at the ranges and dispersion of modern armies it makes sense to give planners the idea that while there may be a center of gravity, there are decisive points that may be more efficient to attack in order to affect the enemies' center of gravity. This addition to JP 5-0 shows that the writers took into account the importance of identifying intermediate actions or areas that would assist in reaching the campaign or operation objective. The changes to the modern battlefield have made it unlikely that an enemy will present that singular troop concentration or point that

will provide the killing blow. Rather, there may be a need to strike multiple points to achieve the decisive blow. These intermediate points may be geographic that increase allied maneuver capabilities or space. They may be political in nature, or related to a population base. These decisive points may also be military units, that once destroyed or neutralized, will open a path to center of gravity.

Jomini's contribution to JP 5-0 did not end with the inclusion of his decisive points. JP 5-0 went further and included his concept of lines of operation and lines of communication. Jomini's theory began with the idea of identifying the battle space between identified decisive points. It is these potential connectors within a "zone of operation"¹⁷ that may define where an army would operate. He defined lines of communication as those lines that connected different parts of a respective army.¹⁸ Jomini further broke down the lines of operation and communication theory into external lines and interior lines. Jomini's theories present planners with a way to shape and organize the battlefield. Not only for friendly assets, but also to build the intelligence preparation of the battlefield for expected enemy movement and action. The addition of these connectors allows planners to conceptualize start and end points with respect to critical areas of the battlefield, or how to most effectively reach a particular center of gravity.

A Second Look at Clausewitz

The final "original" theorist that will be examined is Sir Basil Henry Liddell Hart. Liddell Hart drew on his experiences during World War I and subsequent study through World War II to develop his own take on some of Clausewitz's concepts and maxims. Hart also theorized about the concepts of mobile armor and mechanized forces as well as the mobility and strategic implications of aviation. Certainly Clausewitz could not have considered the capabilities that now occupy the battlefield. Liddell Hart wrote about numerous topics and took

issue with Clausewitz's concepts. What will be examined here are the theory and study of the indirect and direct approach that are also incorporated in the Joint Operations Publication.

Liddell Hart and his study of historical battles and campaigns in conjunction with his experiences during WWI and WWII reinforced his belief in the indirect approach. The essence of Hart's theory is, "The principles of war, not merely one principle, can be condensed into a single word – 'concentration.' But for truth this needs to be amplified as the 'concentration of strength against weakness'."¹⁹

JP 5-0 defines Direct as, "A direct approach attacks the enemy's COG or principal strength by applying combat power directly against it."²⁰ Indirect is defined as, "attacks the enemy's COG by applying combat power against a series of decisive points that lead to the defeat of the COG while avoiding enemy strength."²¹ There is a lot of value added to the concept of centers of gravity with JP 5-0's addition of direct and indirect approaches. This concept gives the COG theory context to the modern battlefield. First, the direct and indirect approach addresses the potential need to attack an enemy's strength by addressing weak points in order to defeat his strength or center of gravity. These approaches also deal with the modern scope and size of potential battlefields. While large battlefields certainly existed at the time of Clausewitz and Jomini, the adversary's army often presented itself in a single concentration. In his study of Napoleon's tactics Liddell Hart found that Napoleon preferred the indirect method, but often reverted in a direct method because of his propensity for impatience and his belief that he possessed tactical superiority. On occasion this led to suffering high casualties despite victory.²² Hart concluded "its ultimate effect on Napoleon's own fortunes, do not encourage a resort to similar directness even with a similar tactical superiority."²³ The acknowledgement of the indirect approach shows that the center of gravity may not be within reach or that it may be

addressed by means other than strength on strength. However, the advantage or capability to conduct strength on strength attack cannot be overlooked either. At the time Liddell Hart conceptualized his theory and his study of history it was rare that an engagement of two strengths would not result in the expenditure of combat power by both sides. However, Desert Storm provides one such counter to the indirect method. If you consider the Iraqi armor capability, many believed that the numerical superiority and the quality of the T-72 would result in heavy casualties for Allied ground forces. In reality, this match up demonstrated that strength on strength engagements could be to our advantage. The advanced capabilities of the M1A1 versus the T-72 provided the capability to deal a decisive blow without the loss of U. S. combat power.²⁴ The concept of having the option to attack an enemy either directly or indirectly has been added to JP 5-0. “Understanding the relationship between a COG’s critical capabilities, requirements, and vulnerabilities can illuminate direct and indirect approaches to the COG. Planners can investigate both direct and indirect methods for attacking an enemy’s center of gravity.”²⁵ This concept enhances the concept of center of gravity and provides more creative methods for addressing them.

Contemporary Contributions

Now that we have established the major theorists whose concepts have contributed to JP 5-0, it is now time to look at some of the more recent theorists and their contributions. While the concepts they have studied and written about are not different from the earlier lines of thinking, their study of the subject has made the original ideas more useable in today’s military operations and should be noted. As stated in the introduction, the list of those who have written and studied center of gravity theory is quite long. I have narrowed the list down to a few major contributors

on the subject, whose contributions or elements of them have found their way into the Joint Operations publication.

Dr. Joseph Strange and Col Richard Iron

One of the most influential contributors to center of gravity analysis and its current usage in military planning is Dr. Strange. Dr. Strange has introduced numerous concepts and modern interpretations of Clausewitz and Liddell Hart. His most notable contribution is his model of Center of Gravity (CG), Critical Capability (CC), Critical Requirement (CR), and Critical Vulnerabilities (CV). After Dr. Strange's introduction of his center of gravity model he has also paired with Col Richard Iron to further dissect and translate Clausewitz's original definition from Howard and Paret's *On War*. First, we will look at an updated definition and interpretation of Clausewitz's original meaning, and then we will dissect Dr. Strange's model of CG-CC-CR-CV, identify the specific components of his model, and how they are incorporated into JP 5-0. Perhaps the fact that Dr. Strange and Richard Iron used another translation of Carl Von Clausewitz is what has led to their difference in COG analysis. The changes are subtle but certainly have meaning when examined. Strange and Iron draw their translations from J. J. Graham's, *Guide to Tactics*.

J. J. Graham translates Clausewitz's definition as a “centre of gravity is always situated where the greatest mass of matter is collected, and as a shock against the centre of gravity of a body always produces the greatest effect, and further, as the most effective blow is struck with the centre of gravity of the power used, so it is also in war.”²⁶ The difference as Strange and Iron write is the addition of “effect” on the enemy, vice “the heaviest blow is struck by the center of gravity,” as translated by Howard and Paret. Strange and Iron contend that “What is important is the adversarial nature of center of gravity” which is missing from Howard and Paret’s

translation.²⁷ The importance of this subtle change is this definition changes the focus of how to determine the center of gravity and what its purpose is. In JP 5-0, it says the COG is “in an adversarial context.”²⁸ This directs the planner to consider COGs in regard both to friendly and enemy organization which ultimately begins to drive course of action development. Strange and Iron describe this context as, “Clausewitzian centers of gravity are not characteristics, capabilities, or locations. They are dynamic and powerful physical and moral agents of action and influence with certain qualities and capabilities that derive benefit from a given location or terrain.”²⁹ To put this theory into action Strange and Iron discuss the Republican Guard as being identified during the planning of Desert Storm as a COG. Based on the addition of context in relation to friendly units and the potential effect the Republican Guard had to the VII Corps is what made them a COG, not purely by being a concentration of military force.³⁰

Dr. Strange has provided a model that accomplishes two things in the realm of COG analysis. First, his model breaks down each component of a center of gravity to help planners identify centers of gravity. Second, his model builds upon the indirect approach from Liddell Hart’s book *Strategy*. The following definitions come from Dr. Strange and Richard Irons, *Part 2 of, UNDERSTANDING CENTERS OF GRAVITY AND CRITICAL VULNERABILITIES*.

Critical Capabilities (CC): every center of gravity has some primary ability (or abilities) that makes it a center of gravity in the context of a given scenario, situation or mission – including phases within campaigns or operations. Mostly simply stated: what can this center of gravity do to you that puts great fear (or concern) into your heart in the context of your mission and level of war? Within a critical capability, the key word is the verb: it can *destroy* something, or *seize* an objective, or *prevent* you from achieving a mission.³¹

Critical Requirements (CR) are conditions, resources and means that are essential for a center of gravity to achieve its critical capability.³²

Critical Vulnerabilities (CV) are those critical requirements, or components thereof, that are deficient, or vulnerable to neutralization or defeat in a way that will contribute to a center of gravity failing to achieve its critical capability.³³

These definitions almost verbatim are incorporated into the COG section of the Joint Operations Planning Publication. The importance of Strange and Iron's usage of an alternate translation and the CV model are substantial. It provides added explanation to the definition for planners to consider, and this model bridges the gap from Liddell Hart's theory of the indirect approach and the usage of decisive points.

Col John Warden

Another modern theorist on the subject of center of gravity is Col John Warden, a former U. S. Air Force officer, who put his vast combat and planning experience into his book, *The Air Campaign*, written while he attended the National War College. While his contributions to center of gravity theory and the current form center of gravity analysis takes in JP 5-0 are not as overt as Dr. Strange and Richard Iron, the contributions are significant and worthy of mention. His perspectives are written purely from an aviation planning perspective but bring to light some considerations for the potential complexity of military operations. Col Warden breaks his definition of center of gravity down to a, "point where the enemy is most vulnerable and the point where the attack will have the best chance of being decisive."³⁴ Col Warden's definition somewhat merges the idea of COG and CV into one point. Regardless of this variation in the definition his exploration into multiple COGs at different levels plays into the decisive point theory and the overall relationship those points must have in relation to a COG or military objective.

Another point that exists in the Joint Operations Planning publication is the concept that these targets must be reachable; possess the resources to strike, and authorization.³⁵ The idea of time and distance brings to light the scale at which air operations are executed. The notion of authorization is the first time that modern obstacles like rules of engagement and boundaries are

considered.³⁶ Harry Summers' book, *On Strategy* hits home regarding the strategic failure of the Vietnam War when military planners and civilian policy prevented the offensive against the source of war, North Vietnam.³⁷ The notion of waging war if you cannot attack an enemy's strength is further clarified by Shelford Bidwell's assessment of U.S. withdrawal from Vietnam, "by adopting the classical principles of war by cutting off the trouble at the root...If this was not politically realistic, then the war should not have been fought at all."³⁸ Col Warden also explores the notion of efficiency and opportunity. In the context of air campaigns he explores utilizing assets efficiently and being able to act on a potential COG, especially if the COG in question is only reachable when certain conditions permit.³⁹ Col Warden also discusses the possibility that while some targets may not provide long term strategic value, the application of force on those targets may yield freedom of action and strengthen a friendly COG in the process, an intermediate step.⁴⁰ Ultimately, Col Warden advocates efficient application of force resulting in decisive actions. These aspects of his book again bring modern application to the COG discussion.

The Joint Operation Planning Publication: "One of the most important tasks confronting the JFC's staff during planning is identifying and analyzing friendly and adversary COGs."⁴¹

What has been presented thus far is an overview of the major contributors to JP 5-0, demonstrating the depth of COG theory in the 2011 revision. JP 5-0 has incorporated major elements of the "classical" theorists of center of gravity. The theorists incorporated consist of Carl Von Clausewitz, Antonie-Henri Jomini, and B. H. Liddell Hart. These three military theorists, while writing at different times and putting the theory of center for gravity into different contexts, provide a different aspect for military planners to explore. Following the original theory, some of the contemporary aspects of COG theory have been added for planners to consider. The addition of Dr. Strange and Richard Iron's critical vulnerability model help

identify how to view the direct and indirect approach, and dissect the components that make up center of gravity. Col Warden's air planning studies, while not overtly apparent, add modern usage and assist the targeting process at the conceptual level. What is important to note from the JP 5-0 is not only the amount of theory that was used to provide planners the analytical tools to successfully plan joint operations, but the message JP 5-0 gives the planner concerning center of gravity. JP 5-0 conveys the following message to joint planners, "This process cannot be taken lightly, since a faulty conclusion resulting from a poor or hasty analysis can have very serious consequences, such as the inability to achieve strategic and operational objectives at an acceptable cost."⁴²

JP 5-0 clearly demonstrates the importance of center of gravity analysis and has finally succeeded in providing the joint planner with the tools required for successful COG analysis. Now that the background and understanding of theory of center of gravity analysis has been explained, we will look at the tools given to Marine planners in the 2010 Marine Corps Warfighting Publication (MCWP) 5-1, *Marine Corps Planning Process*.

The Marine Corps Planning Process

The United States Marine Corps prides itself on being the most flexible and innovative service in the Department of Defense. Part of that culture is that the Marine Corps does things differently from other services. For example, the Marine Corps organizes into the Marine Air-Ground Task Force (MAGTF) for any number of operations ranging from combat operations to Humanitarian Aid and Disaster Relief (HADR). It should then come as no surprise that the Marine Corps has its own planning process, The Marine Corps Planning Process (MCPP). When dissecting the MCPP you will see that it is almost identical to the Joint Operations Planning Process (JOPP), and other service component planning processes, like the Army's Military

Decision Making Process (MDMP). Why each service branch maintains its own planning process rather than adapting the JOPP is a topic for another paper. What will be compared is the level and quality of center of gravity analysis that exists in MCWP 5-1 compared to that of JP 5-0.

The Marine Corps Warfighting Publication 5-1 is supposed to provide the Marine planner the tools to execute the MCPP. MCPP in the recent 2010 edition replaced the first step of the planning process, “mission analysis,” with “problem framing.” The purpose of this change was to emphasize the need to understand the problem, which will provide the commander and his planning staff a complete picture of the operational environment and a clear vision of mission success. Problem Framing, much like Mission Analysis in the JOPP, is the most important step in the planning process. The key components in this step are; commander’s orientation, understanding of the environment, commanders’ intent, task analysis, and center of gravity analysis. MCWP 5-1 offers approximately a half page to the description and purpose of centers of gravity. First, center of gravity in MCWP 5-1 is defined as; “The source of power that provides moral or physical strength, freedom of action, or will to act.”⁴³ If you recall the definition from JP 5-0 and the associated theories provided to joint planners, there is a distinct difference in the level of detail provided in the basic definition. While MCWP 5-1 gives planners in its half page describing the purpose of identifying friendly and enemy COGs and critical vulnerabilities, it does not arm planners with much more than some vague guidance about commanders identifying what will be a decisive action against a critical vulnerability.

This COG analysis is a means to focus the commander and staff on what is most important around all the variables and factors that can influence the conduct of operations. Determining COG is an art. At a minimum, commands should think in terms of strengths and weaknesses.⁴⁴

After reading this section in the MCWP 5-1, the Marine planner is left with a vague concept of finding an enemy's weakness and applying his strength there, a poor definition that is a fraction of what is available from Clausewitz alone. It is noted however, that this center of gravity thing is "the most important variable to influence the conduct of operations."⁴⁵ Last but not least, the MCWP tells planners that center of gravity analysis is an art. Not many tools are given to planners with regard to the actual definition, or how to conduct the analysis of centers of gravity. No guidance or explanation is provided regarding the potential that not only can there be multiple centers of gravity, but also that centers of gravity can exist at every level. The MCPP does remind the planner in the following steps of the planning process that course of action (COA) development and refinement of the battlespace should be based on the centers of gravity that are identified for both friendly and enemy forces. Furthermore, the steps of Wargaming and COA comparison should be based on refinement as required for COGs identified during problem framing.

One thing a Marine planner does know is that the art he applied to identifying and analyzing centers of gravity now drives the rest of the planning process. It is no wonder that many Marine planners cannot provide an accurate definition of COG, and many more planners are skeptical of its utility in planning. Often the COG is given the default, "will of the people", or "air power." For such an important driver in the planning process the planner should be armed with more tools to ensure the planning process is built around a clear and correct analysis of the centers of gravity within an operation.

The Marine Corps Planning Process: Moving Forward

After researching the background theory and the number of tools provided to planners in the Joint Operations Publication 5-0, it is apparent that the MCPP is deficient in providing the

same level of support to Marine planners. In order to provide the Marine planner the knowledge and tools to accurately identify centers of gravity and properly analyze COG, additions to the 5-1 are necessary. The MCWP 5-1 should start by including all the sources and theory currently found in the JP 5-0. The inclusion of all these sources accomplishes two purposes. First, it gives Marine planners much more background information than currently available in Marine Corps publications. This would also provide planners with a one-stop document to look at multiple aspects of center of gravity analysis. Second, having all the theory and different examples from the JP 5-0 would allow planners to look creatively at potential problems during the COA development with that creativity in mind. Additionally, by having similar center of gravity analysis theory, Marine planners will be able to better integrate into a joint planning team because they would be using the same tools and language that exist in the JP 5-0.

The MCWP 5-1 should go one step further and incorporate examples of center of gravity analysis. This aspect is currently lacking from the JP 5-0. Dr. Strange presents one method for modeling center of gravity (Figs 1 and 2). Figure 1 shows multiple COGs at the different levels of war, and context for why they are COGs, and figure 2 shows a model for identifying the components of a particular COG. There are certainly other methods that could be added as well, but the point is to provide planners with an example of what COG analysis should look like. For an element that is so important throughout every step of military planning, telling a Marine planner it's "an art" is not enough.

LEVELS OF WAR AND IRAQI CENTERS OF GRAVITY 1991

<i>Level of War</i>	<i>Coalition example missions</i>	<i>Example opposing Iraq CG</i>	<i>Why it's a CG</i>
(a)	(b)	(c)	(d)
Strategic Level			
• National Policy	→ Restore the legitimate Government of Kuwait.	Saddam Hussein	Can maintain popular support and direct the Iraqi Army to hold Kuwait against international condemnation and coercion.
• Theater Strategy	→ Defeat the Iraqi Army south of Euphrates.	Iraqi Army	Can defend occupied Kuwait against Coalition attack.
Operational Level			
• Campaigns	→ Isolate and encircle the Iraqi Army in Kuwait.	Republican Guard	Can prevent encirclement of Iraqi Army defending Kuwait.
• Major Operations	→ Cut communications from Baghdad to Kuwait.	Iraqi integrated air defence system	Can prevent freedom of action of Coalition air through high attrition of allied aircraft.
Tactical Level			
• Battles	→ Penetrate the Iraqi defences along the Saudi border.	Iraqi 12 th Corps	Can prevent VII Corps penetration of Iraqi linear defences using fixed defensive positions.
• Engagements	→ Defeat Tawakalna Division on 73 Easting.	Tawakalna Division reserve Tank battalion.	Can counter attack and defeat elements of VII Corps attacking Tawakalna Division.
• Small unit actions	→ Breach element of Iraqi defensive line.	Iraqi defensive bunker complex.	Can defeat breaching attempt through use of direct fire weapons.

Figure 1⁴⁶

CG # 1: US/UK Strategic Bombers based in the UK.

Allied CG #1	CC
#1: US/UK Strategic Bombers based in the UK.	<ul style="list-style-type: none"> Delay German ability to achieve effective operational mass of U-boats via heavy bombardment of the sources of U-boat production in Germany. Interdict logistic sustainment of U-boat operations via heavy bombardment of U-boat pens in France.
CR	<p>CV</p> <ul style="list-style-type: none"> (No CV here. Intelligence was not the problem. See below.) Hardened final assembly facilities. Poor bombing accuracy in 1942-43. Number of available bombers overall and other bombing priorities, precludes a <i>sustained</i> bombing effort against this target set. Pens are <i>exceptionally</i> hardened targets. Poor bombing accuracy in 1942-43. Number of available bombers overall and other bombing priorities, precludes a <i>sustained</i> bombing effort against this target set. An effective solution via strategic bombing could take two years, and even then ????

Figure 2⁴⁷

What's Next For Center of Gravity? "Should the work be interrupted by my death, then what is found can only be called a mass of conceptions not brought into form...open to endless misconceptions." – Carl Von Clausewitz⁴⁸

The theory of center of gravity is not new. The amount of writing, study, and debate since the time of Clausewitz's writing exceeds extensive. It has been invaluable for military theorists to dissect and explore the translations, context, and different meanings of the center of gravity and related theories. However, the academic competition of finding yet another translation or contextual meaning needs to come to an end. Dale Eikmeier's quote in his *Joint Forces Quarterly* critique of the JP 5-0 turns the page on center of gravity analysis, "It does not

matter what Carl Von Clausewitz said about center of gravity (COG) in the 19th century. What matters is how we want to use the COG concept in the 21st century.”⁴⁹

Center of Gravity analysis will become more important in the near future. Since 2001 we have been in two theaters of war and as time passed, the maturity of the wars dulled the military planner’s edge. Almost every commander who participated in Iraq or in Afghanistan found themselves continuing the mission of the previous commander in whatever area of operation they were assigned. Not much in the way of conceptual planning was required. Tactical proficiency on specific mission sets was a positive byproduct of these wars. However, as we approach the 2014 withdrawal from Afghanistan, military planners will find themselves responding to new contingency operations requiring a keen eye for creative conceptual planning. The ability to accomplish this planning quickly and efficiently will be critical to future success. The lessons from the Global War on Terror must not be lost, but planners must not limit themselves to analyzing new missions with the same old lens. Additionally, the fiscal realities that now face the Department of Defense will potentially require planners to plan and execute complex military operations with limited assets. Being able to operate efficiently, and understand how to identify the enemy and friendly strengths and weaknesses in order to apply combat power effectively, is the essence of center of gravity analysis. Marine planners will need these skills as instability continues to grow around the globe and as the Marine Corps’ refocus on the Pacific theater begins to take shape. Without the proper tools for center of gravity analysis, Marine planners cannot effectively plan with the innovation and imagination that often are the hallmarks of the Marine Corps. Without innovative conceptual planning, the Marine Corps cannot be the elite fighting force of the future.

Appendix A

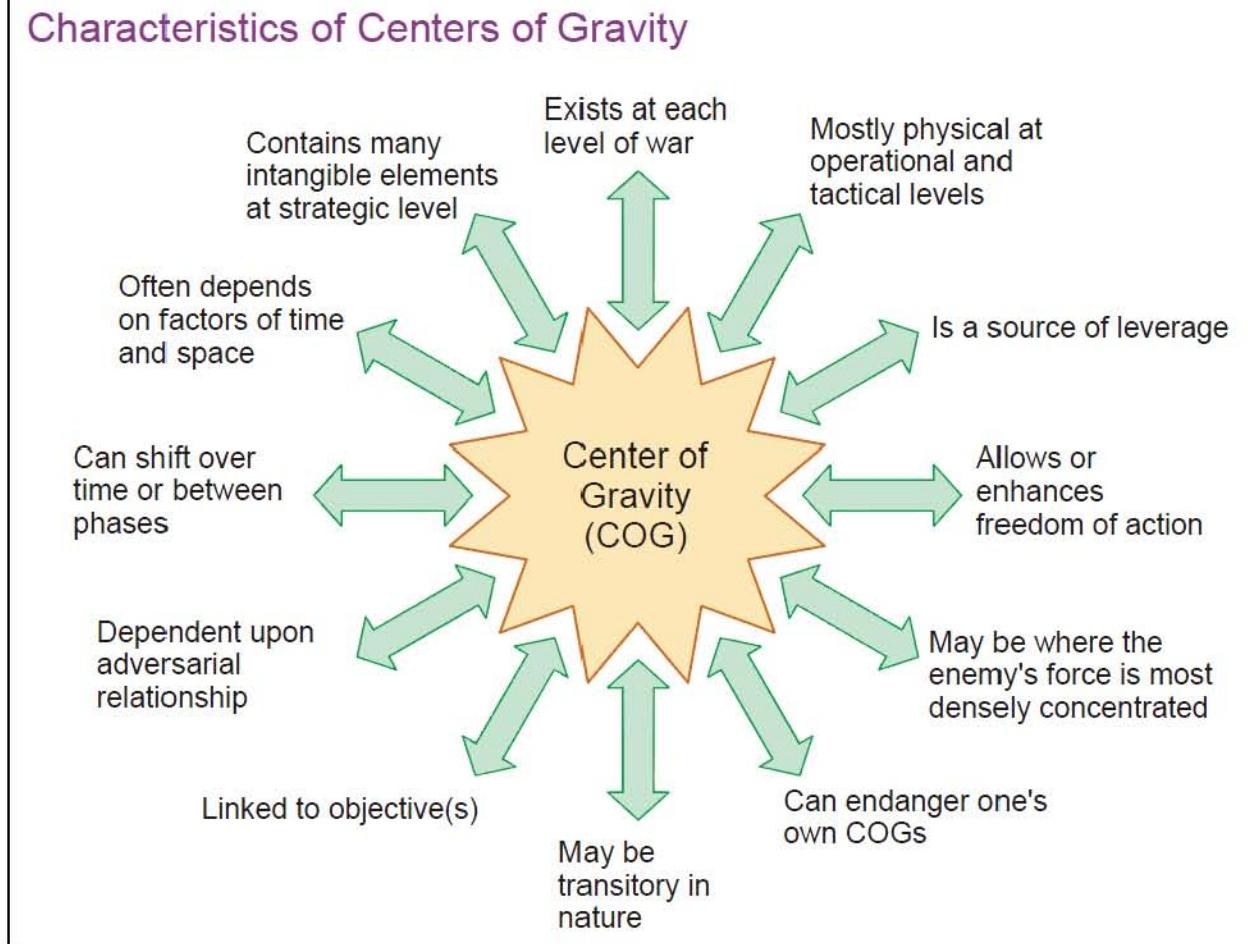


Figure 1¹

¹ JP 5-0, III 23.

Center of Gravity Analysis Example

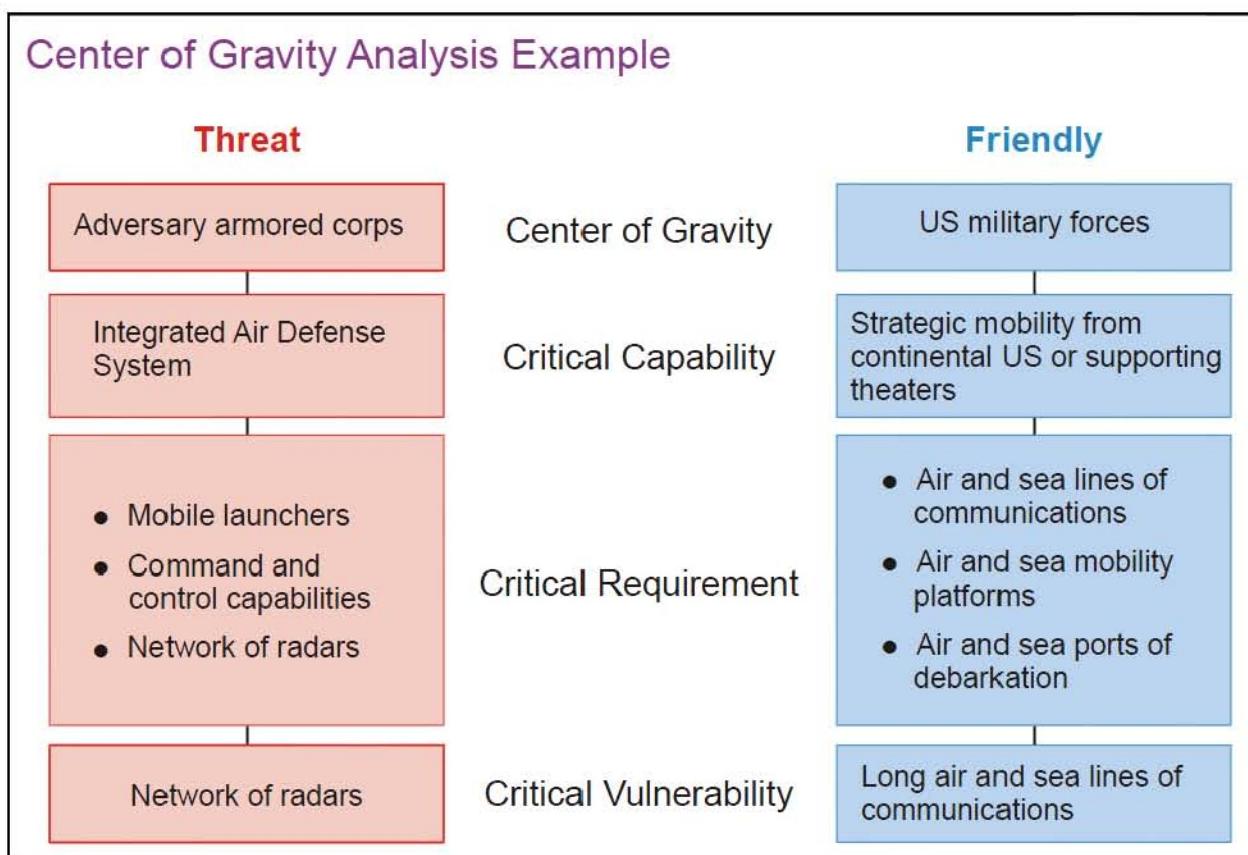


Figure 2²

² JP 5-0, III 25.

Strategic Framework and Center of Gravity Analysis

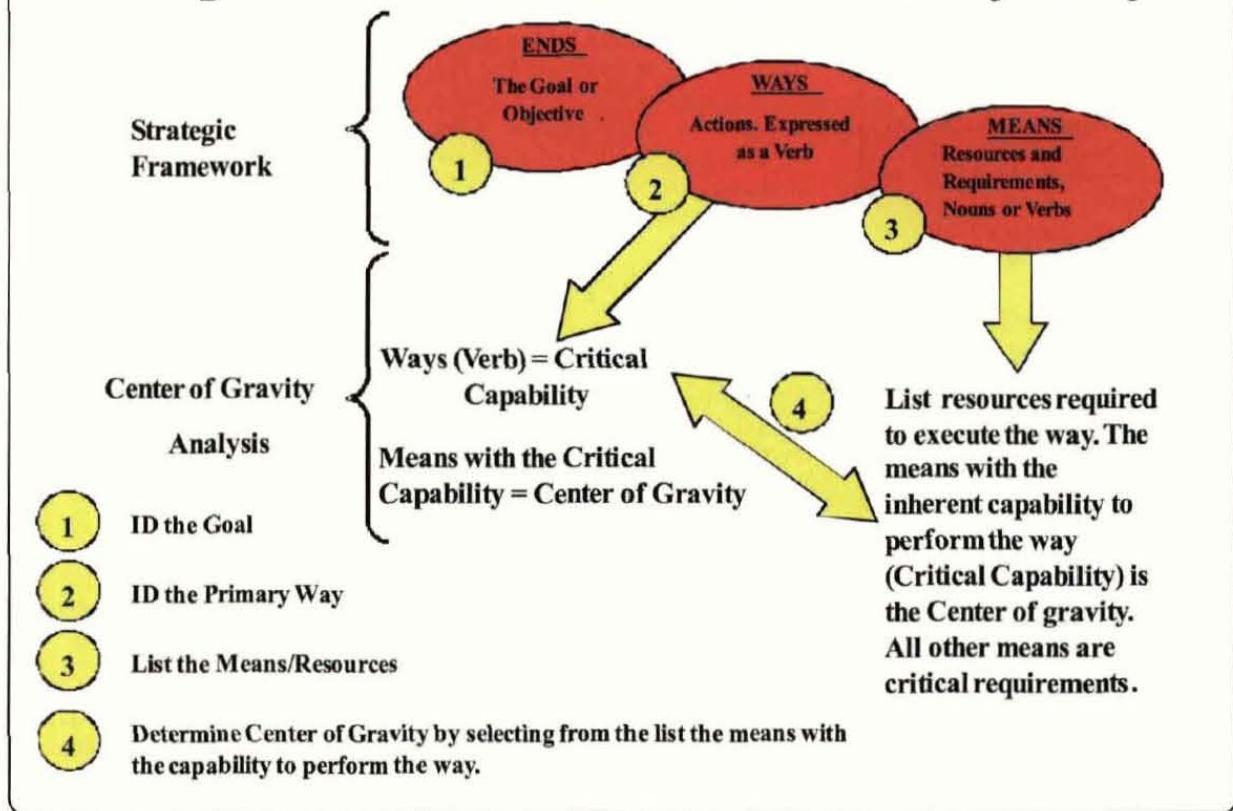


Figure 3³

³ Dale, Eikmeier, C. "Centers of Gravity: Changing the Way We Think," *Marine Corps Gazette*, November 2010, 99.

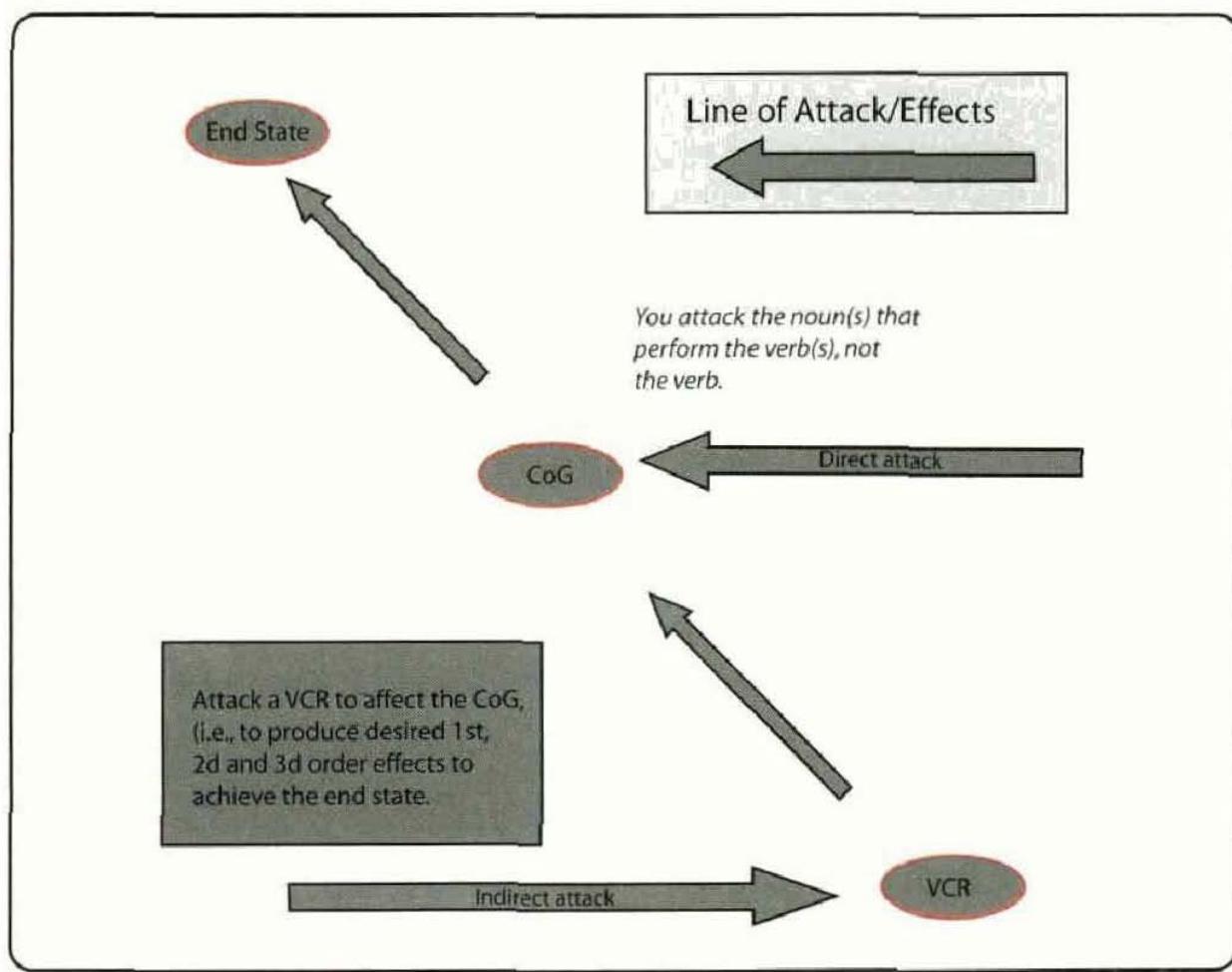


Figure 4⁴

⁴ Eikmeier, 102.

Direct and Indirect Approach

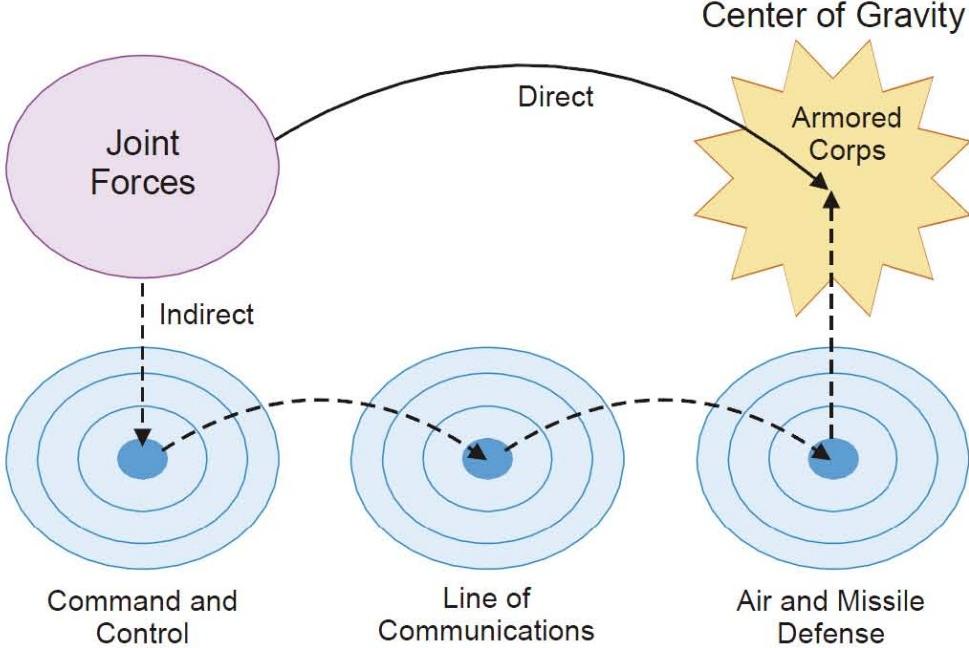


Figure 5⁵

⁵ JP 5-0, III 32.

End Notes

¹ Carl von Clausewitz, *On War*, ed. Michael Howard and Peter Paret, trans by Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984) , 18.

² Clausewitz, xi.

³ General James Amos, "Strategic Communications," (PowerPoint presentation, Marine Corps University, Quantico, VA, 10 January 2013).

⁴ Clausewitz, 95.

⁵ Clausewitz, 485

⁶ Clausewitz, 617.

⁷ Clausewitz, 617.

⁸ David G. Chandler, *The Campaigns of Napoleon*, (New York: MacMillan, 1968), 141. Chandler. Quoted in Dr. James Schneider and Lawrence Izzo's, *Clausewitz's Elusive Center of Gravity*, 55.

⁹ James Rainey, "Center of Gravity: Is the Concept still Relevant?" (master's thesis, School of Advanced Military Studies, 1999), <http://stinet.dtic.mil/>, 9.

¹⁰ Clausewitz, 595.

¹¹ JP 5-0, III 22.

¹² De Baron Jomini, *The Art of War*, trans by G. H. Mendell and W. P. Craighill. Westport, Connecticut, CT: Greenwood Press, 1971, 85.

¹³ Jomini, 85.

¹⁴ Jomini, 86.

¹⁵ Jomini, 88.

¹⁶ JP 5-0, III 26.

¹⁷ Jomini, 100.

¹⁸ Jomini, 101.

¹⁹ B. H. Liddell Hart, *Strategy: Second Revised Edition*, New York: Penguin Books, 1991, 334.

²⁰ JP 5-0, III 31.

²¹ JP 5-0, III 32.

²² Hart, 144.

²³ Hart, 144.

²⁴ James, Blackwell, *Thunder in the Desert*. New York: Bantam Books, 1991, 206.

²⁵ JP 5-0, III 26.

²⁶ Carl von Clausewitz, *On War*, translated by J.J. Graham (London: Kegan Paul,Trench, Trübner, 1908), volume I, book six, p. 354, as quoted in Joseph Strange and Richard Iron's, "Center of Gravity: What Clausewitz Really Meant." *Joint Forces Quarterly*, issue 35 (2004): <http://stinet.dtic.mil/>, 24.

²⁷ Strange and Iron, 24.

²⁸ JP 5-0, III 22.

²⁹ Strange and Iron, 27.

³⁰ Strange and Iron, 24.

³¹ Strange and Iron, part 2, 7.

³² Strange and Iron, part 2, 7.

³³ Strange and Iron, part 2, 8.

³⁴ John A. Warden, *The Air Campaign*, Virginia: Pergamon-Brassey's International Defense Publishers, Inc., 1989, 7.

³⁵ Warden, 7.

³⁶ Warden, 7.

³⁷ Harry G. Summers, *On Strategy, a critical analysis of the Vietnam War*, California: Presidio Press, 1995, 88.

³⁸ Shelford Bidwell, *Modern Warfare: A Study of Men, Weapons, and Theories* (London: Allen Lane, 1973), 234. Quoted by Harry Summers, 124.

³⁹ Warden, 34.

⁴⁰ Warden, 131.

⁴¹ JP 5-0, III 22.

⁴² JP 5-0, III 23.

⁴³ MCWP 5-1, glossary-3.

⁴⁴ MCWP 5-1, 2-5.

⁴⁵ MCWP 5-1, 2-5.

⁴⁶ Joe Strange and Richard Iron. *Understanding Centers of Gravity and Critical Vulnerabilities: Parts 1 and 2*.

<http://www.au.af.mil/au/awc/awcgate/usmc/cog1.pdf>, 4.

⁴⁷ Joe Strange and Richard Iron. *Understanding Centers of Gravity and Critical Vulnerabilities: Parts 1 and 2*.

<http://www.au.af.mil/au/awc/awcgate/usmc/cog1.pdf>, 12.

⁴⁸ Carl von Clausewitz, as quoted by B.H. Liddell Hart in *Strategy: Second Revised Edition*, 344.

⁴⁹ Dale Eikmeier “Redefining the Center of Gravity.” *Joint Forces Quarterly*, issue 59 (4th

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